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Determination of toxicity of a gas or gas mixture

Détermination de la toxicité d'un gaz ou d'un mélange de gaz



Reference number ISO 10298:2010(E)

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Contents

Forew	ordiv
Introdu	uctionv
1	Scope
2	Terms and definitions1
3 3.1	Determination of toxicity
3.1 3.2	General
3.3	Calculation method
Annex	A (informative) LC ₅₀ values for toxic gases and toxic vapours used in gas mixtures
Annex	B (informative) Selection of an LC ₅₀ value for a particular gas7
Biblioç	A (informative) LC ₅₀ values for toxic gases and toxic vapours used in gas mixtures

Foreword

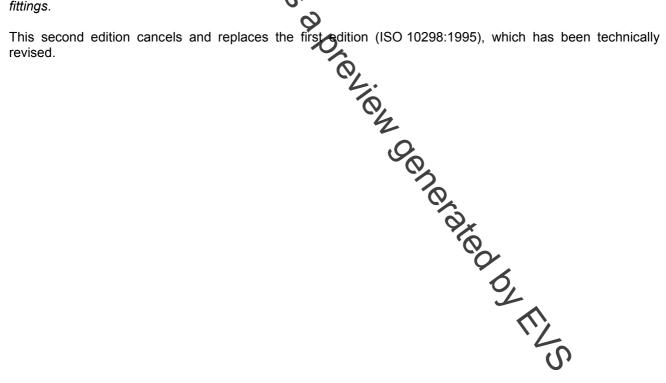
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ISO 10298 was prepared by Technical Committee ISO/TC 58, Gas cylinders, Subcommittee SC 2, Cylinder fittings.



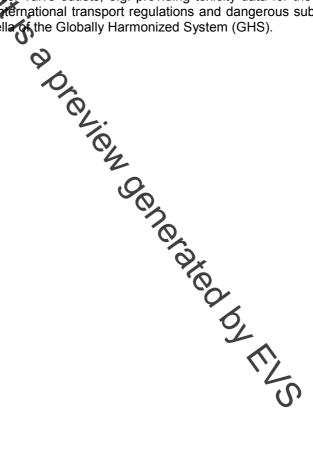
Introduction

ISO 5145 "*Cylinder valve outlets for gases and gas mixtures* — *Selection and dimensioning*" and similar standards establish practical criteria for the determination of outlet connections of cylinder valves. These criteria are based on certain physical and chemical properties of the gases, in particular, the acute toxicity of the gases.

One of the difficulties in the application of ISO 5145 resides in the fact that, in the case of single components, there are abundant data in the literature (although differences may be found, depending upon the test methods employed), but in the case of gas mixtures, data in the literature are often incomplete or even non-existent.

The aim of this International standard is to eliminate the ambiguities in the case of differences in the literature, to supplement existing data and to give a calculation method for gas mixtures.

Since the publication of the first edition of ISO 10298, this International Standard has been used for other purposes than the selection of cylinder valve outlets, e.g. providing toxicity data for the classification of gas and gas mixtures according to the international transport regulations and dangerous substances regulations, which since 2003 is under the umbrella of the Globally Harmonized System (GHS).



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Determination of toxicity of a gas or gas mixture

1 Scope

This International standard lists the best available acute-toxicity data of gases from the literature to allow the classification of gases and gas mixtures.

2 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

2.1

lethal concentration 50

LC₅₀

concentration of a gas (or a gas mixture) in air administered by a single exposure during a short period of time (24 h or less) to a group of young adult allow rats (males and females) which leads to the death of half of the animals in at least 14 days

2.2

toxicity level

level of toxicity of gases and gas mixtures

NOTE 1 In ISO 5145, the toxicity level is divided into three groups:

- Subdivision 1: non toxic [LC₅₀ > 5 000 ppm (volume fraction)]
- Subdivision 2: toxic [200 ppm (volume fraction) $< LC_{50} \le 5000$ ppm (volume fraction)]
- Subdivision 3: very toxic $[LC_{50} \leq 200 \text{ ppm (volume fraction)}]$

where

LC₅₀ values correspond to 1 h exposure to gas;

ppm (volume fraction) indicates parts per million, by volume.

NOTE 2 In the GHS, the inhalation toxicity levels are:

Category 1: Fatal if inhaled 0 ppm $< LC_{50} \le 100$ ppm (volume fraction)

Category 2: Fatal if inhaled 100 ppm (volume fraction) $< LC_{50} \le 500$ ppm (volume fraction)

Category 3: Toxic if inhaled 500 ppm (volume fraction) $< LC_{50} \le 2500$ ppm (volume fraction)

Category 4: Harmful if inhaled 2 500 ppm (volume fraction) $< LC_{50} \le 20000$ ppm (volume fraction)

NOTE 3 In GHS, the LC₅₀ values correspond to 4 h exposure. Consequently, the LC₅₀ values given in Annex A (see 3.2.2) need to be divided by 2 (i.e. $\sqrt{4/1}$). The reasoning behind the division by 2 is given in Clause B.2.

, DY FY